

Plenoptic Attitude Monitoring System, Phase I

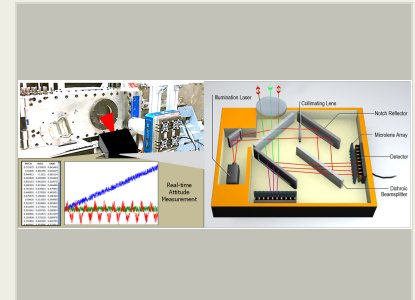
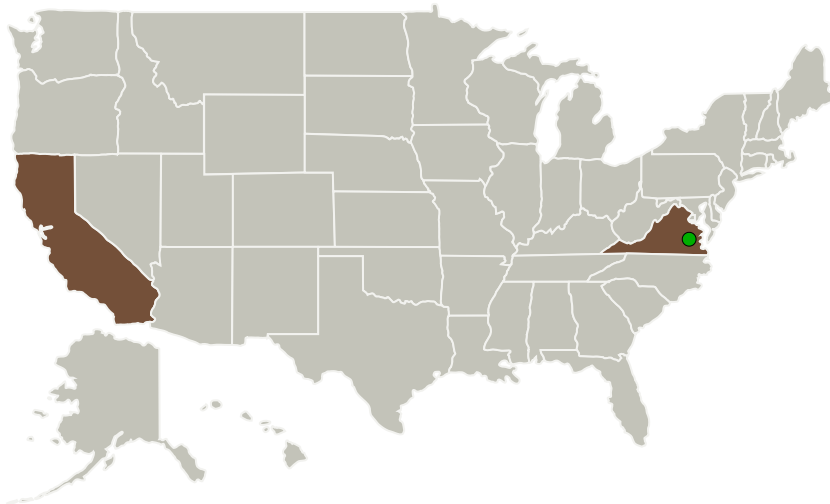
Completed Technology Project (2016 - 2016)



Project Introduction

NASA is seeking an optical system capable of analyzing the attitude of wind tunnel models in real time, with a high angular resolution and robustness. To address this need, Physical Optics Corporation (POC) proposes to develop a new Plenoptic Attitude Monitoring (PAM) system, which utilizes a dual plenoptic imager to extract attitude information. The innovative dual plenoptic design utilizes one plenoptic imager to analyze and correct for turbulence effects introduced by airflow around the model, while the second imager extracts the attitude information from the model itself. This system is capable of providing real-time measurements with a high angular resolution of better than 9 arcsec. As an analytical imaging based system, PAM may also be placed in any location that provides it with a view of the model under test, thereby ensuring compatibility with existing monitoring technologies and enabling protection from wind tunnel temperature and pressure conditions. The compactness of the design also minimizes setup and calibration time, thereby fully compatible and reducing the impact on wind tunnel operations. During Phase I, POC will design and demonstrate the feasibility of the PAM system using a low-speed wind tunnel and modeling for higher wind speeds. By the completion of Phase II, POC will demonstrate the PAM system in subsonic, supersonic, and hypersonic wind tunnel tests and finalize the design for production.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

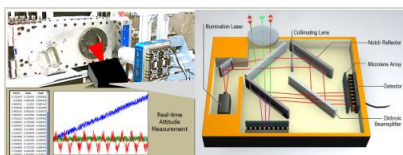
▶ **June 2016:** Project Start

✓ **December 2016:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139631>)

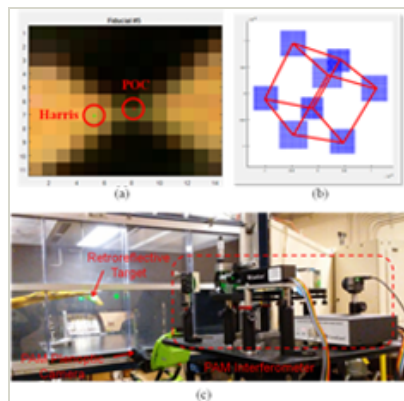
Images



Briefing Chart Image

Plenoptic Attitude Monitoring System, Phase I

(<https://techport.nasa.gov/image/129636>)



Final Summary Chart Image

Plenoptic Attitude Monitoring System, Phase I Project Image
(<https://techport.nasa.gov/image/136669>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Physical Optics Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

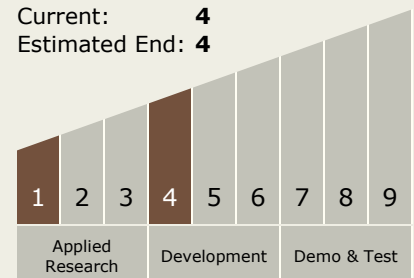
Carlos Torrez

Principal Investigator:

Marc Segall

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.8 Ground and Flight Test Technologies

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System